70310

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
SANFORD T. COLB & CO.
P.O. BOX 2273
76122 REHOVOT
ISRAEL

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)*
Applicant's or agent's file reference 70310	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/IL 11/00116	International filing date *(day/month/year)* 01 February 2011 (01.02.2011)
Applicant METACURE LIMITED	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450	Authorized officer Lee W. Young
Facsimile No. 571-273-3201	Telephone No. PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
SANFORD T. COLB & CO.
P.O. BOX 2273
76122 REHOVOT
ISRAEL

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)* 02 SEP 2011
Applicant's or agent's file reference 70310	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/IL 11/00116	International filing date *(day/month/year)* 01 February 2011 (01.02.2011)
Applicant METACURE LIMITED	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer Lee W. Young PCT Helpdesk: 571-272-4300 Telephone No. PCT OSP: 571-272-7774

Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 70310	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/IL 11/00116	International filing date *(day/month/year)* 01 February 2011 (01.02.2011)	(Earliest) Priority Date *(day/month/year)* 01 February 2010 (01.02.2010)
Applicant METACURE LIMITED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☒ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

   a. the figure of the **drawings** to be published with the abstract is Figure No. 1

   ☒ as suggested by the applicant.

   ☐ as selected by this Authority, because the applicant failed to suggest a figure.

   ☐ as selected by this Authority, because this figure better characterizes the invention.

   b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL 11/00116

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Group I: Claims 1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213; directed to apparatus and methods for treating a human patient without calculating an impedance of tissue of the fundus.

Group II: Claims 2, 3, 26/(2)-85/(2), 95, 116/(95)-194/(95), 196, 208; directed to apparatus and methods for treating a human patient by sensing during the first mode of operation, and not during the second mode of operation.

Group III: Claims 4, 26/(4)-85/(4), 96, 116/(96)-194/(96), 197, 209; directed to apparatus and methods for treating a human patient by withholding sensing a parameter for a duration.

Group IV: Claims 5-9, 26/(5)-85/(5), 97-101, 116/(97)-194/(97), 198, 210; directed to apparatus and methods for treating a human patient wherein an electrical signal includes a plurality of pulses.

Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL 11/00116

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61N 1/00 (2011.01)
USPC - 607/40
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
US: 607/40; IPC: A61N 1/00 (2011.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
US: 600/1, 309, 345, 347, 365; 607/1, 2, 40, 59, 60, 61, 62, A61N$ (keyword limited, see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWest (PGPB,USPT,EPAB,JPAB); Google (patents and scholar)
Search Terms: Gastrointestinal, GI, Gastroparesis, Fundus, antrum, stomach, pancreas, intestine, duodenum, jejunum, ileum, liver, gallbladder, electric$5, signal$4, stimulat$5, activat$5, excit$5, provok$5, impel$4, trigger$4, electrod$3, contact$3, terminal$3, anode,

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Sanmiguel, et al., 'Gastric Electrical Stimulation with the TANTALUS(Reg) System in Obese Type 2 Diabetes Patients: Effect on Weight and Glycemic Control.', Journal of Diabetes Science and Technology: Diabetes Technology Society, July 2009, Vol. 3, Issue 4, p. 1-7; entire document, especially abstract, pg 2, col 1 - pg 6, col 1 and Figure 1.	1, 21, 26/(1, 21), 28/(1, 21), 41/(1, 21)-50/(1, 21), 81/(1,21)-85/(1,21), 86, 87, 113, 116/(86, 113)-126/(86,113), 185/(86, 113)-186/(86,113), 189/(86,113)-194/(86,113), 195, 201, 204, 213
------		------
Y		27/(1,21), 29/(1,21)-40/(1,21), 51/(1,21)-80/(1,21), 127/(86,113)-184/(86,113), 187/(86,113)-188/(86,113)
Y	US 2008/0046062 A1 (Camps et al.) 21 February 2008 (21.02.2008), entire document, especially Fig 7 and para [0027]-[0067]	27/(1,21), 29/(1,21)-36/(1,21)
Y	US 2009/0204063 A1 (Policker et al.) 13 August 2009 (13.08.2008)m entire document, especially Title, Abstract, Fig 13-14 and para [0103]-[0409]	37/(1, 21)-40/(1,21)

☒ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 August 2011 (25.08.2011)	02 SEP 2011
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL 11/00116

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2009/0088816 A1 (Harel et al.) 2 April 2009 (02.04.2009), entire document, especially Abstract, para [0051]-[0656]	51/(1,21)-80/(1,21), 127/(86,113)-184/(86,113) and 187/(86,113)-188/(86,113)
A	Policker, et al., 'Electrical Stimulation of the Gut for the Treatment of Type 3 Diabetes: The Role of Automatic Eating Detection.', Journal of Diabetes Science and Technology: Diabetes Technology Society, July 2009, Vol. 3, Issue 4, p. 906-912	1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213
A	US 2005/0164925 A1 (Jakubowski et al.) 28 July 2005 (25.07.2005), entire document	1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL 11/00116

Box No. III Observations where unity of invention is lacking

Group V: Claims 10-18, 26/(10)-85/(10), 102-110, 116/(102)-194/(102), 199, 211; directed to apparatus and methods for treating a human patient having signal-application periods and reduced-signal-application periods.

Group VI: Claims 19, 20, 26/(19)-85/(19), 111, 112, 116/(111)-194/(111), 200, 212; directed to apparatus and methods for treating a human patient without a control unit applying, or generating a signal for applying, any additional glucose-control or weight-control therapy to the patient.

Group VII: Claims 22, 23, 26/(22)-85/(22), 114, 115, 116/(114)-194/(114), 202, 214; directed to apparatus and methods for treating a human patient by driving an electrode contact surface using no more than 5 J over a 24-hour period.

Group VIII: Claims 24, 25, 26/(24)-85/(24), 203; directed to apparatus for treating a human patient wherein a control unit is sized such that at least one line that passes from edge to edge of the control unit through a center of gravity thereof has a length of no more than 2 cm.

Group IX: Claims 88-92, 116/(88)-194/(88), 205; directed to methods for treating a human patient by endoscopically making one or more incisions through a fundic wall of the patient.

Group X: Claims 93, 94, 116/(93,94)-194/(93,94), 206, 207; directed to methods for treating a human patient by identifying that application of an electrical signal to at least one fundic site of the patient might improve a blood glucose level of the patient.

Group XI: Claims 215-239; directed to apparatus and method for treating a human patient through a first site and a second site, which second site is at least 5 cm distal to the first site.

The inventions listed as Groups I - XI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical feature of Group I is treatment without calculating an impedance of tissue of the fundus, which is not present in Group II-XI. The special technical feature of Group II is sensing during the first mode of operation, and not during the second mode of operation, which is not present in Group I or III-XI. The special technical feature of Group III is withholding sensing a parameter for a duration, which is not present in Group I, II, or IV-XI. The special technical feature of Group IV is an electrical signal including a plurality of pulses, which is not present in Group I-III or V-XI. The special technical feature of Group V is having signal-application periods and reduced-signal-application periods, which is not present in Group I-IV or VI-XI. The special technical feature of Group VI is a control unit not applying, nor generating a signal for applying, any additional glucose-control or weight-control therapy to the patient, which is not present in Group I or III-XI. The special technical feature of Group VII is driving an electrode contact surface using no more than 5 J over a 24-hour period, which is not present in Group I-VI, or VIII-XI. The special technical feature of Group VIII is a control unit sized such that at least one line that passes from edge to edge of the control unit through a center of gravity thereof has a length of no more than 2 cm, which is not present in Group I-VII or IX-XI. The special technical feature of Group IX is endoscopically making one or more incisions through a fundic wall of the patient, which is not present in Group I-VIII, X, or XI. The special technical feature of Group X is identifying that application of an electrical signal to at least one fundic site of the patient might improve a blood glucose level of the patient, which is not present in Group I-IX or XI. The special technical feature of Group XI is a first site and a second site, which second site is at least 5 cm distal to the first site, which is not present in Group I-X.

The sole element of commonality between groups I-XI is that of a set of one or more electrodes, configured to be applied to a site of the GI tract, and a control unit, configured to drive the electrode set to apply a signal at the site, which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0173]--"gastric device 26 comprises one or more electrodes 100, which are driven by control unit 90 to apply an enhancement signal to respective sites on or in a vicinity of stomach 20").

The sole element of commonality between groups I-X is that of implantable electrode contact surfaces, configured to be applied to a fundus, , which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0108]--"In this embodiment, local sense electrodes 74 comprise two or more electrodes through which a small current is driven. A simultaneous measurement of the resultant voltage drop yields the impedance. When local sense electrodes 74 have been placed on or in both the fundus and the antrum, the control unit is typically configurable to allow a healthcare worker to select whether the impedance from the findus and/or the antrum is used."), and applying an electrical signal to the fundus that chronically improves a blood glucose level of the patient in order to treat the patient, which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0248]--"System 600 comprises a control unit 602 and one or more electrodes 604, which are driven by control unit 602 to apply an Excitable-Tissue Control (ETC) signal to respective sites on or in a vicinity of stomach 20, responsive to detection of natural electrical activity of the stomach" (while Ben-Haim does not specify that the sites in the stomach are the fundus, the fundus is part of the stomach and would therefore be an obvious site for placement); para [0249]--"Control unit 602 configures the ETC signal to reduce a blood glucose level of the patient"; para [0260]--"control unit 602 is configured to drive electrodes 604 generally constantly, not responsive to detection of eating. Alternatively, the stimulation is applied periodically, such as once to several times an hour, during certain times of day or night, or in response to a command from the subject").

The sole element of commonality between groups II-IV is that of sensing a parameter that varies in response to the applied electrical signal, and calculating, based on the sensed parameter, an impedance of tissue of the fundus, which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0053]--"impedance measurements using electrodes placed on or near the fundus detect eating somewhat earlier than do impedance measurements using electrodes placed on or near the antrum"; para [0188]--"local sense electrodes 74 comprise two or more electrodes through which a small current is driven. A simultaneous measurement of the resultant voltage drop yields the impedance. When local sense electrodes 74 have been placed on or in both the fundus and the antrum, the control unit is typically configurable to allow a healthcare worker to select whether the impedance from the findus and/or the antrum is used").

Accordingly, unity of invention is lacking under PCT Rule 13.1.

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: SANFORD T. COLB & CO.
P.O. BOX 2273
76122 REHOVOT
ISRAEL

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	02 SEP 2011
Applicant's or agent's file reference 70310	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/IL 11/00116	01 February 2011 (01.02.2011)	01 February 2010 (01.02.2010)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - A61N 1/00 (2011.01)
USPC - 607/40

Applicant METACURE LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 *bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	26 August 2011 (26.08.2011)	Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 11/00116

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 11/00116

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the appicable time limit:

   ☐ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

Group I: Claims 1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213; directed to apparatus and methods for treating a human patient without calculating an impedance of tissue of the fundus.

Group II: Claims 2, 3, 26/(2)-85/(2), 95, 116/(95)-194/(95), 196, 208; directed to apparatus and methods for treating a human patient by sensing during the first mode of operation, and not during the second mode of operation.

Group III: Claims 4, 26/(4)-85/(4), 96, 116/(96)-194/(96), 197, 209; directed to apparatus and methods for treating a human patient by withholding sensing a parameter for a duration.

Group IV: Claims 5-9, 26/(5)-85/(5), 97-101, 116/(97)-194/(97), 198, 210; directed to apparatus and methods for treating a human patient wherein an electrical signal includes a plurality of pulses.

Group V: Claims 10-18, 26/(10)-85/(10), 102-110, 116/(102)-194/(102), 199, 211; directed to apparatus and methods for treating a human patient having signal-application periods and reduced-signal-application periods.

Group VI: Claims 19, 20, 26/(19)-85/(19), 111, 112, 116/(111)-194/(111), 200, 212; directed to apparatus and methods for treating a human patient without a control unit applying, or generating a signal for applying, any additional glucose-control or weight-control therapy to the patient.

Group VII: Claims 22, 23, 26/(22)-85/(22), 114, 115, 116/(114)-194/(114), 202, 214; directed to apparatus and methods for treating a human patient by driving an electrode contact surface using no more than 5 J over a 24-hour period.

Group VIII: Claims 24, 25, 26/(24)-85/(24), 203; directed to apparatus for treating a human patient wherein a control unit is sized such that at least one line that passes from edge to edge of the control unit through a center of gravity thereof has a length of no more than 2 cm.

Group IX: Claims 88-92, 116/(88)-194/(88), 205; directed to methods for treating a human patient by endoscopically making one or more incisions through a fundic wall of the patient.

Group X: Claims 93, 94, 116/(93,94)-194/(93,94), 206, 207; directed to methods for treating a human patient by identifying that application of an electrical signal to at least one fundic site of the patient might improve a blood glucose level of the patient.

Group XI: Claims 215-239; directed to apparatus and method for treating a human patient through a first site and a second site, which second site is at least 5 cm distal to the first site.

Please See Continuation Sheet

4. Consequently, this opinion has been established in respect of the following parts of the international application:

   ☐ all parts

   ☒ the parts relating to claims Nos. 1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 11/00116

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	See Below	YES
	Claims	See Below	NO
Inventive step (IS)	Claims	See Below	YES
	Claims	See Below	NO
Industrial applicability (IA)	Claims	See Below	YES
	Claims	See Below	NO

2. Citations and explanations:

Novelty (N)	1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213	Yes
	None	No
Inentive Step (IS)	None	No
	1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213	Yes
Industrial Applicability (IA)	1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213	Yes
	None	No

Claims 1, 21, 26/(1, 21), 28/(1, 21), 41/(1, 21)-50/(1, 21), 81/(1,21)-85/(1,21), 86, 87, 113, 116/(86, 113)-126/(86,113), 185/(86, 113)-186/(86,113), 189/(86,113)-194/(86,113), 195, 201, 204 and 213 lack an inventive step under PCT Article 33(3) as being obvious over the Article titled "Gastric Electrical Stimulation with the TANTALUS System in Obese Type 2 Diabetes Patients: Effect on Weight and Glycemic Control" by Sanmiguel, et al. (hereinafter 'Sanmiguel').

With respect to claim 1, Sanmiguel teaches an Apparatus (investigational device, Abstract - Background), the apparatus for treating a human patient (diabetes patients, Title; eleven subjects, Abstract, Results) comprising:
one or more electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure), which are configured to be applied to a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure) and
a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure), configured to drive the one or more electrode contact surfaces to apply an electrical signal to the fundus (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation) that chronically improves a blood glucose level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg. 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg. 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), for detecting eating by the patient or a characteristic of food eaten by the patient (system is designed to automatically detect when eating starts, Abstract--Background; onset of a meal was automatically determined by an algorithm embedded in the implantable pulse generator, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation). Sanmiguel does not disclose not calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

Please See Continuation Sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL 11/00116

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of:
Box N. Vi(3) Lack of Unity of Invention

The inventions listed as Groups I - XI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical feature of Group I is treatment without calculating an impedance of tissue of the fundus, which is not present in Group II-XI. The special technical feature of Group II is sensing during the first mode of operation, and not during the second mode of operation, which is not present in Group I or III-XI. The special technical feature of Group III is withholding sensing a parameter for a duration, which is not present in Group I, II, or IV-XI. The special technical feature of Group IV is an electrical signal including a plurality of pulses, which is not present in Group I-III or V-XI. The special technical feature of Group V is having signal-application periods and reduced-signal-application periods, which is not present in Group I-IV or VI-XI. The special technical feature of Group VI is a control unit not applying, nor generating a signal for applying, any additional glucose-control or weight-control therapy to the patient, which is not present in Group I or III-XI. The special technical feature of Group VII is driving an electrode contact surface using no more than 5 J over a 24-hour period, which is not present in Group I-VI, or VIII-XI. The special technical feature of Group VIII is a control unit sized such that at least one line that passes from edge to edge of the control unit through a center of gravity thereof has a length of no more than 2 cm, which is not present in Group I-VII or IX-XI. The special technical feature of Group IX is endoscopically making one or more incisions through a fundic wall of the patient, which is not present in Group I-VIII, X, or XI. The special technical feature of Group X is identifying that application of an electrical signal to at least one fundic site of the patient might improve a blood glucose level of the patient, which is not present in Group I-IX or XI. The special technical feature of Group XI is a first site and a second site, which second site is at least 5 cm distal to the first site, which is not present in Group I-X.

The sole element of commonality between groups I-XI is that of a set of one or more electrodes, configured to be applied to a site of the GI tract, and a control unit, configured to drive the electrode set to apply a signal at the site, which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0173]--"gastric device 26 comprises one or more electrodes 100, which are driven by control unit 90 to apply an enhancement signal to respective sites on or in a vicinity of stomach 20").

The sole element of commonality between groups I-X is that of implantable electrode contact surfaces, configured to be applied to a fundus, which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0108]--"In this embodiment, local sense electrodes 74 comprise two or more electrodes through which a small current is driven. A simultaneous measurement of the resultant voltage drop yields the impedance. When local sense electrodes 74 have been placed on or in both the fundus and the antrum, the control unit is typically configurable to allow a healthcare worker to select whether the impedance from the findus and/or the antrum is used."), and applying an electrical signal to the fundus that chronically improves a blood glucose level of the patient in order to treat the patient, which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0248]--"System 600 comprises a control unit 602 and one or more electrodes 604, which are driven by control unit 602 to apply an Excitable-Tissue Control (ETC) signal to respective sites on or in a vicinity of stomach 20, responsive to detection of natural electrical activity of the stomach" (while Ben-Haim does not specify that the sites in the stomach are the fundus, the fundus is part of the stomach and would therefore be an obvious site for placement); para [0249]--"Control unit 602 configures the ETC signal to reduce a blood glucose level of the patient"; para [0260]--"control unit 602 is configured to drive electrodes 604 generally constantly, not responsive to detection of eating. Alternatively, the stimulation is applied periodically, such as once to several times an hour, during certain times of day or night, or in response to a command from the subject").
The sole element of commonality between groups II-IV is that of sensing a parameter that varies in response to the applied electrical signal, and calculating, based on the sensed parameter, an impedance of tissue of the fundus, which is known in the prior art (ref. US 20070027493 A1 to Ben-Haim et al.; para [0053]--"impedance measurements using electrodes placed on or near the fundus detect eating somewhat earlier than do impedance measurements using electrodes placed on or near the antrum"; para [0188]--"local sense electrodes 74 comprise two or more electrodes through which a small current is driven. A simultaneous measurement of the resultant voltage drop yields the impedance. When local sense electrodes 74 have been placed on or in both the fundus and the antrum, the control unit is typically configurable to allow a healthcare worker to select whether the impedance from the findus and/or the antrum is used").

Accordingly, unity of invention is lacking under PCT Rule 13.1.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

With respect to claim 21, Sanmiguel teaches an apparatus (investigational device, Abstract--Background) for treating a human patient (diabetes patients, Title; eleven subjects, Abstract, Results), the apparatus comprising:
a set of one or more implantable electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure), configured to be applied to a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure); and
a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure), configured to drive the electrode contact surfaces to apply an electrical signal to the fundus (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation) that chronically improves a blood glucose level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation). Sanmiguel does not disclose calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

With respect to claim 86, Sanmiguel teaches a method (Method, Abstract - Method) for treating a human patient (diabetes patients, Title; eleven subjects, Abstract, Results), comprising:
implanting (implanted laparoscopically, Abstract--Method; all implantation procedures were performed via laparoscopy, pg 3, col 1, para 2, Surgical Procedure) one or more electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure) in contact with a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure);
providing a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure) coupled to the electrode contact surfaces (leads were connected to an implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure); and
activating the control unit to drive the electrode contact surfaces (The system was interrogated and programmed pg 3, col 1, para 2, Surgical Procedure), to apply an electrical signal to at least one fundic site of the patient (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 2, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 2, Gastric Contractility Modulation/Electrical Stimulation) that chronically improves a blood glucose level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 2, col 1, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), for sensing eating by the patient or a characteristic of food eaten by the patient (system is designed to automatically detect when eating starts, Abstract--Background; onset of a meal was automatically determined by an algorithm embedded in the implantable pulse generator, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation). Sanmiguel does not disclose calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

With respect to claim 113, Sanmiguel teaches a method (Method, Abstract--Method) for treating a human patient (diabetes patients, Title; eleven subjects, Abstract, Results), comprising:
implanting (implanted laparoscopically, Abstract--Method; all implantation procedures were performed via laparoscopy, pg 3, col 1, para 2, Surgical Procedure) one or more electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure) in contact with a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure);
providing a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure) coupled to the electrode contact surfaces (leads were connected to an implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure); and activating the control unit (The system was interrogated and programmed pg 3, col 1, para 2, Surgical Procedure) to:
drive the electrode contact surfaces to apply an electrical signal to at least one fundic site of the patient (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 2, col 1, Gastric Contractility Modulation/Electrical Stimulation), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), and
configure one or more parameters of the electrical signal to chronically improve a blood glucose level of the patient, in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1). Sanmiguel does not disclose calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

Please See Continuation Sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 11/00116

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

With respect to claim 195, Sanmiguel teaches an apparatus (investigational device, Abstract - Background) for treating a human patient (diabetes patients, Title; eleven subjects, Abstract, Results), the apparatus comprising:
one or more electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure), which are configured to be applied to a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure); and
a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure), configured to drive the electrode contact surfaces to apply an electrical signal to the fundus (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation) that improves a blood glucose level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), for detecting eating by the patient or a characteristic of food eaten by the patient (system is designed to automatically detect when eating starts, Abstract--Background; onset of a meal was automatically determined by an algorithm embedded in the implantable pulse generator, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation). Sanmiguel does not disclose calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

With respect to claim 201, Sanmiguel teaches an apparatus (investigational device, Abstract - Background) for treating a human patient (diabetes patients, Title; eleven subjects, Abstract, Results), the apparatus comprising:
a set of one or more implantable electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure), configured to be applied to a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure); and
a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure), configured to drive the electrode contact surfaces to apply an electrical signal to the fundus (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation) that improves a blood glucose level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3 Gastric Contractility Modulation/Electrical Stimulation). Sanmiguel does not disclose calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

With respect to claim 204, Sanmiguel teaches a method (Method, Abstract--Method) for treating a human patient (diabetes patients, Title; eleven subjects, Abstract, Results), comprising:
implanting (implanted laparoscopically, Abstract--Method; all implantation procedures were performed via laparoscopy, pg 3, col 1, para 2, Surgical Procedure) one or more electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure) in contact with a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure);
providing a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure) coupled to the electrode contact surfaces (leads were connected to an implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure); and
activating the control unit (The system was interrogated and programmed pg 3, col 1, para 2, Surgical Procedure) to drive the electrode contact surfaces to apply an electrical signal to at least one fundic site of the patient (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation) that improves a blood glucose level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), for sensing eating by the patient or a characteristic of food eaten by the patient (system is designed to automatically detect when eating starts, Abstract--Background; onset of a meal was automatically determined by an algorithm embedded in the implantable pulse generator, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation). Sanmiguel does not disclose calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

Please See Continuation Sheet

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

With respect to claim 213, Sanmiguel teaches a method (Method, Abstract - Method) for treating a human patient (diabetes patients,Title; eleven subjects, Abstract, Results), comprising:
implanting (implanted laparoscopically, Abstract--Method; all implantation procedures were performed via laparoscopy, pg 3, col 1, para 2, Surgical Procedure) one or more electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure) in contact with a fundus of the patient (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure);
providing a control unit (implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure) coupled to the electrode contact surfaces (leads were connected to an implantable pulse generator, pg 3, col 1, para 2, Surgical Procedure); and
activating the control unit (The system was interrogated and programmed pg 3, col 1, para 2, Surgical Procedure) to:
drive the electrode contact surfaces to apply an electrical signal to at least one fundic site of the patient (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), based on a sensed parameter that varies in response to the electrical signal (deliver sessions or gastric electrical stimulation (GES) with electrical pulses that are synchronized to the intrinsic antral slow waves, Abstract--Background; Gastric contractility modulation was delivered, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; electrical pulses, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), and
configure one or more parameters of the electrical signal to improve a blood glucose level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), in order to treat the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1). Sanmiguel does not disclose calculating an impedance of tissue of the fundus based on a sensed parameter that varies in response to the electrical signal. Therefore, it would have been obvious to one of ordinary skill in the art that such a calculation would not be needed for the use of the device.

With respect to claims 26/(1,21) and 116/(86,113), Sanmiguel teaches the apparatus according to claims 1 and 21 and the method of claim 86 and 113, Sanmiguel further teaching exactly one electrode structure that comprises the one or more electrical contact surfaces (electrodes constituting each pair, pg 3, col 1, para 2, Surgical Procedure).

With respect to claim 28/(1,21), Sanmiguel teaches the apparatus according to claim 26/(1,21), Sanmiguel further teaching the electrode contact surfaces comprise exactly two electrode contact surfaces (electrodes constituting each pair, pg 3, col 1, para 2, Surgical Procedure).

With respect to claim 41/(1,21), Sanmiguel teaches the apparatus according to claim 26/(1,21), Sanmiguel further teaching the one or more electrode contact surfaces comprise a plurality of electrode contact surfaces, and wherein the electrode structure is configured to constrain motion of the electrode contact surfaces so as to define a greatest possible distance between closest respective portions of any two of the electrode contact surfaces, which distance is no more than 10 cm (distance of 2-4 cm between the electrodes, pg 3, col 1, para 2, Surgical Procedure).

With respect to claims 42/(1,21) and 117/(86,113), Sanmiguel teaches the apparatus according to claims 1 and 21 and the method of claim 86 and 113, Sanmiguel further teaching the control unit is configured to configure the electrical signal such that the signal, if applied to an antrum of the patient (anterior and posterior wall of the antrum, pg 3, col 1, para 2, Surgical Procedure) but does not specifically teach the signal would not effect an improvement in a blood glucose level of the patient. However, one skilled in the art would find it obvious to modify the references such that the signal would not effect an improvement in a blood glucose level of the patient to best promote patient welfare and healing.

With respect to claims 43/(1,21)-49/(1,21), Sanmiguel further teaches the apparatus is configured to be implantable in the patient for long-term application of the electrical signal (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure) as recited by claims 43/(1,21);
the electrode contact surfaces are configured to be applied in physical contact with muscle tissue of the fundus (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure) as recited by claims 44/(1,21);
the electrode contact surfaces are configured to be positioned within the muscle tissue (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure) as recited by claims 45/(1,21);
the apparatus is configured to treat diabetes of the patient as recited (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 46/(1,21);
the apparatus is configured to treat type 2 diabetes of the patient (report the effect of this type of GES on weight loss and glucose control in overweight/obese subjects with type 2 diabetes mellitus, Abstract--Background; Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 47/(1,21);
the apparatus is configured to treat metabolic syndrome of the patient (report the effect of this type of GES on weight loss and glucose control in overweight/obese subjects with type 2 diabetes mellitus, Abstract--Background; Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 48/(1,21);
the control unit is configured to configure one or more parameters of the electrical signal to cause a reduction in a fasting glucose blood level of the patient (pg. 3, col 2, para 1, Data and Statistical Analysis; Fasting glucose levels tended to diminish over time with treatment, pg 4, col 1, para 3) as recited by claims 49/(1,21).

Please See Continuation Sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL 11/00116

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of:
Box V. 2 Citations and Explanations

With respect to claim 50/(1,21), Sanmiguel teaches the apparatus according to claims 1 and 21, but does not specify that the control unit is configured to configure one or more parameters of the electrical signal to cause a reduction in postprandial glucose level of the patient. However, as the electrical treatment is configured to be triggered by food consumption (system is designed to automatically detect when eating starts, Abstract--Background; onset of a meal was automatically determined by an algorithm embedded in the implantable pulse generator, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), it would have been obvious to one of ordinary skill in the art that the unit might thereby cause a reduction in postprandial glucose level of the patient.

With respect to claims 81/(1,21) and 189/(86,113), Sanmiguel teaches the apparatus according to claims 1 and 21 and the method according to claims 86 and 113, further teaching the control unit is configured to apply the signal in a series of pulses (electrical pulses used a biphasic system waveform, pg 3, col 1, Gastric Contractility Modulation/ Electrical Stimulation) but does not specifically teach having an energy per pulse of no more than 5 microjoules. However, one skilled in art would find it obvious to modify the teaches of Sanmiguel to include a specific energy pulse to promote glycemic control while preventing damage to the tissues from excessive energy transfer.

With respect to claims 82/(1,21) and 190/(86,113), Sanmiguel teaches the apparatus according to claims 1 and 21 and the method according to claims 86 and 113, further teaching the control unit is configured to apply the signal in a series of pulses (electrical pulses used a biphasic system waveform, pg 3, col 1, Gastric Contractility Modulation/ Electrical Stimulation) but does not specifically teach the control unit is configured to apply the signal in a series of pulses having an average energy per pulse of no more than 5 microjoules. However, one skilled in art would find it obvious to modify the teaches of Sanmiguel to include a specific energy pulse to promote glycemic control while preventing damage to the tissues from excessive energy transfer.

With respect to claims 83/(1,21) and 191/(86,113), Sanmiguel teaches the apparatus according to claims 1 and 21 and the method according to claims 86 and 113, but does not specifically teach the control unit is configured to apply the signal having an instantaneous power of no more than 100 milliwatts. However, one skilled in art would find it obvious to modify the teaches of Sanmiguel to include a specific instantaneous power to promote glycemic control while preventing damage to the tissues from excessive energy transfer.

With respect to claims 84/(1,21) and 192/(86,113), Sanmiguel teaches the apparatus according to claims 1 and 21 and the method according to claims 86 and 113, further teaching the control unit is configured to apply the signal in a series of pulses (electrical pulses used a biphasic system waveform, pg 3, col 1, para 3, Gastric Contractility Modulation/ Electrical Stimulation) but does not specifically teach at least one of which pulses has a duration of between 2 microseconds and 5 millisecond. However, one skilled in art would find it obvious to modify the teaches of Sanmiguel to include a specific pulse duration to promote glycemic control.

With respect to claims 85/(1,21) and 193/(86,113), Sanmiguel teaches the apparatus according to claims 1 and 21 and the method according to claims 86 and 113, further teaching the control unit is configured to apply the signal in a series of pulses (electrical pulses used a biphasic system waveform, pg 3, col 1, para 3, Gastric Contractility Modulation/ Electrical Stimulation) but does not specifically teach at least one of which pulses has an amplitude of between 5 mA and 35 mA. However, one skilled in art would find it obvious to modify the teaches of Sanmiguel to include a specific amplitude to promote glycemic control.

With respect to claim 87, Sanmiguel teaches the apparatus according to claim 86, further teaching activating comprises configuring the control unit to apply the signal to the at least one fundic site (one pair of electrodes in the fundus, pg 3, col 1, Surgical Procedure) at least intermittently during a period having a duration of at least one week (Eleven subjects reached the 6-month treatment period endpoint, Abstract--Results; Gastric contractility modulation was delivered for 75 min, starting at the detected onset of a meal, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation; Figure 1).

Please See Continuation Sheet

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:
Box V. 2 Citations and Explanations

With respect to claims 118/(86,113)-125/(86,113), Sanmiguel further teaching implanting the one or more electrode contact surfaces comprises implanting the one or more electrode contact surfaces in physical contact with muscle tissue of the fundic site (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure) as recited by claims 118/(86,113);
implanting the one more electrode contact surfaces comprises positioning the one or more electrode contact surfaces within the muscle tissue as recited (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure) by claims 119/(86,113);
implanting the electrode contact surfaces and activating the control unit comprises identifying that the patient suffers from diabetes, and implanting and activating in response to the identifying (report the effect of this type of GES on weight loss and glucose control in overweight/obese subjects with type 2 diabetes mellitus, Abstract--Background; Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 120/(86,113);
implanting the electrode contact surfaces and activating the control unit comprises identifying that the patient suffers from type 2 diabetes, and implanting and activating in response to the identifying (report the effect of this type of GES on weight loss and glucose control in overweight/obese subjects with type 2 diabetes mellitus, Abstract--Background; Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 121/(86,113);
wherein implanting the electrode contact surfaces and activating the control unit comprises identifying that the patient suffers from metabolic syndrome and implanting and activating in response to the identifying (report the effect of this type of GES on weight loss and glucose control in overweight/obese subjects with type 2 diabetes mellitus, Abstract--Background; Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 122/(86,113);
implanting the electrode contact surfaces and activating the control unit comprises identifying that the patient might benefit from improved blood glucose level control, and implanting and activating (report the effect of this type of GES on weight loss and glucose control in overweight/obese subjects with type 2 diabetes mellitus, Abstract--Background; Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) in response to the identifying as recited by claims 123/(86,113);
implanting the electrode contact surfaces and activating the control unit comprises identifying that the patient might experience an improvement. in the blood glucose level in response to applying the signal, and implanting and activating in response to identifying (report the effect of this type of GES on weight loss and glucose control in overweight/obese subjects with type 2 diabetes mellitus, Abstract--Background; Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 124/(86,113);
wherein activating comprises configuring one or more parameters of the electrical signal to cause a reduction in a fasting glucose blood level of the patient (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claims 125/(86,113).

With respect to claim 126/(86,113), Sanmiguel teaches the method according to claims 86 and 113, but does not specify that activating comprises configuring one or more parameters of the electrical signal to cause a reduction in postprandial glucose level of the patient. However, as the electrical treatment is configured to be triggered by food consumption (system is designed to automatically detect when eating starts, Abstract--Background; onset of a meal was automatically determined by an algorithm embedded in the implantable pulse generator, pg 3, col 1, para 3, Gastric Contractility Modulation/Electrical Stimulation), it would have been obvious to one of ordinary skill in the art that the unit might thereby cause a reduction in postprandial glucose level of the patient.

With respect to claims 185/(86,113) and 186/(86,113), Sanmiguel further teaching assessing blood glucose level control by measuring a level of HbAlc of the patient after activating the control unit (pg 3, col 2, para 5 to pg 4, col 1, para 1, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claim 185/(86,113); and assessing blood glucose level improvement by measuring the blood glucose level after activating the control unit (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) as recited by claim 186/(86,113).

With respect to claim 194/(86,113), Sanmiguel teaches the apparatus according to claims 86 and 113, further teaching activating comprises configuring the control unit to apply the signal for at least three months (Eleven subjects reached the 6-month treatment period endpoint, Abstract--Results; Figure 1).

Claims 27/(1,21), 29/(1,21)-36/(1,21) lack an inventive step under PCT Article 33(3) as being obvious over Sanmiguel in view of US 2008/0046062 A1 to Camps et al.(hereinafter 'Camps').

With respect to claim 27/(1,21), Sanmiguel teaches the apparatus according to claim 26/(1,21), but does not specifically teach the electrode contact surfaces comprise exactly one electrode contact surface. Camps teaches the electrode contact surfaces comprise exactly one electrode contact surface (Fig 1 indicates one lead body 18; para [0029]). Camps is directed to implanting a lead used in gastric implantation therapy (para [0027]). One skilled in the art would find it obvious to combine the references, modifying the teachings of Sanmiguel to include the exactly one electrode contact surface of Camps, as the combination would reduce harm to the patient while implanting the lead.

Please See Continuation Sheet

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

With respect to claims 29/(1,21), Sanmiguel teaches apparatus according to claims 26/(1,21), but does not specifically teach the electrode structure further comprises one or more insulated cables. However, Camps teaches the electrode structure further comprises one or more insulated cables (para [0029], [0039]). Camps is directed to implanting a lead used in gastric implantation therapy (para [0027]). One skilled in the art would find it obvious to combine the references, modifying the teachings of Sanmiguel to include the insulated cables of Camps as the combination would reduce inadvertent electrical shock to the patient.

As per claim 30/(1,21), Camps teaches the apparatus according to claim 29/(1,21), wherein the apparatus comprises exactly one connector, which connects one or more of the insulated cables to the control unit (para [0029], [0032], [0035], [0039]).

As per claim 31/(1,21), Camps teaches the apparatus according to claim 29/(1,21), wherein the one or more insulated cables comprise exactly one insulated cable, having exactly one electrode end and exactly one non-bifurcated end, wherein each of the electrode contact surfaces are coupled to one of the electrode end, and wherein the non-bifurcated end is coupled to the control unit (para [0029], [0032], [0035], [0039]). Camps does not specify wherein the cable is bifurcated, or two bifurcated ends having an electrode surface coupled thereto. However, Camps does teach a plurality of electrode surface located at the distal end of the cable (para [0029]). It would have been obvious to one of ordinary skill in the art that a bifurcated distal end would permit easier placement of the electrode surfaces.

As per claim 32/(1,21), Camps teaches the apparatus according to claim 31/(1,21), wherein the exactly one of the insulated cables comprises a plurality of insulated wires (para [0029]).

As per claim 33/(1,21), Camps teaches the apparatus according to claim 29/(1,21), wherein the one or more insulated cables comprise exactly one insulated cable, having exactly one electrode end and exactly one non-bifurcated end, wherein each of the electrode contact surfaces are coupled to one of the electrode end, and wherein the non-bifurcated end is coupled to the control unit (para [0029], [0032], [0035], [0039]). Camps does not specify wherein the cable is multifurcated, or three multifurcated ends having an electrode surface coupled thereto. However, Camps does teach a plurality of electrode surfaces located at the distal end of the cable (para [0029]). It would have been obvious to one of ordinary skill in the art that a multifurcated distal end would permit easier placement of the electrode surfaces.

As per claim 34/(1,21), Camps teaches the apparatus according to claim 33/(1,21), wherein the exactly one of the insulated cables comprises a plurality of insulated wires (para [0029]).

As per claim 35/(1,21), Camps teaches the apparatus according to claim 29/(1,21), wherein one end of exactly one of the insulated cables is coupled to the control unit (para [0029], [0032], [0035], [0039]).

As per claim 36/(1,21), Camps teaches the apparatus according to claim 35/(1,21), wherein the exactly one of the insulated cables comprises a plurality of insulated wires (para [0029]).

Claims 37/(1, 21)-40/(1,21) lack an inventive step under PCT Article 33(3) as being obvious over Sanmiguel in view of US 2009/0204063 A1 to Policker et al.(hereinafter 'Policker').

With respect to claim 37/(1, 21), Sanmiguel teaches the apparatus according to claim 26/(1, 21) further teaching the electrode structure which is configured to be implanted in a wall of the fundus (one pair of electrodes in the fundus, pg 3, col 1, para 2, Surgical Procedure), and which comprises the one or more electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure) at respective sites of the electrode mount but does not specifically teach the electrode structure comprises a corkscrew-shaped electrode mount. However, Policker teaches a corkscrew-shaped electrode mount (Fig 14B and para [0130]). Policker is directed to a GI lead implantation (Title). One skilled would find it obvious to combine the references, modifying the apparatus of Sanmiguel to include corkscrew-shaped electrode mount as taught by Policker as the combination would promote electrical contact with the tissue and prevent slipping after implantation.

With respect to claim 38/(1, 21), Sanmiguel teaches the apparatus according to claim 26/(1, 21), but does not specifically teach the electrode structure comprises one or more wireless microstimulators. However, Policker teaches the electrode structure comprises one or more wireless microstimulators (Fig 13 and para [0409]). Policker is directed to a GI lead implantation (Title). One skilled would find it obvious to combine the references, modifying the apparatus of Sanmiguel to include wireless microstimulators as taught by Policker as the combination would reduce discomfort to the patient.

With respect to claim 39/(1, 21), Sanmiguel teaches the apparatus according to claim 26/(1, 21), but does not specifically teach the electrode structure comprises exactly one wireless microstimulator. However, Policker teaches the electrode structure comprises exactly one wireless microstimulators (Fig 13 and para [0409]). Policker is directed to a GI lead implantation (Title). One skilled would find it obvious to combine the references, modifying the apparatus of Sanmiguel to include wireless microstimulators as taught by Policker as the combination would reduce discomfort to the patient.

With respect to claim 40/(1, 21), Sanmiguel teaches the apparatus according to claim 26/(1, 21), but does not specifically teach the electrode structure is at least partially flexible. However, Policker teaches a flexible corkscrew-shaped electrode mount (Fig 14B and para [0130], [0157], [0158], [0168]). Policker is directed to a GI lead implantation (Title). One skilled would find it obvious to combine the references, modifying the apparatus of Sanmiguel to include flexible electrode structure as taught by Policker as the combination would prevent discomfort to the patient.

Please See Continuation Sheet

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

Claims 51/(1,21)-80/(1,21), 127/(86,113)-184/(86,113) and 187/(86,113)-188/(86,113) lack an inventive step under PCT Article 33(3) as being obvious over Sanmiguel in view of US 2009/0088816 A1 to Harel et al.(hereinafter 'Harel').

With respect to claim 51/(1,21), Sanmiguel teaches the apparatus according to claims 1 and 21, further teaching the control unit is configured to configure one or more parameters of the electrical signal related to glycemic control (pg 3, col 1, para 2-3; Title) but does not specifically teach configure one or more parameters of the electrical signal related to cause an improvement in a level at least one hormone selected from the group consisting of: at least one hormone associated with glycemic control, and at least one hormone associated with a metabolic disorder. However, Harel teaches cause an improvement in a level at least one hormone selected from the group consisting of: at least one hormone associated with glycemic control, and at least one hormone associated with a metabolic disorder (para [0442]-[0443] and [0656]). Harel teaches using electrical fields to reduce blood insulin levels (Abstract). One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

As per claim 52/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement in the level of the at least one hormone includes a normalization of at least one element selected from the group consisting of: secretion of the at least one hormone, expression of the at least one hormone, and a blood level of the at least one hormone (para [0442]-[0443] and [0656]).

As per claim 53/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the hormone is associated with the glycemic control (para [0442]-[0452] and [0656]).

As per claim 54/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the hormone is associated with the metabolic disorder (Abstract; para [0442]-[0452] and [0656]).

As per claim 55/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the control unit is configured to configure the one or more parameters of the electrical signal to simultaneously cause the improvement in levels of a plurality of hormones (para [0442]-[0452] and [0656]).

As per claim 56/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the at least one hormone is secreted by a stomach of the patient (gastrins, para [0656]).

As per claim 57/(1,21), Harel teaches the apparatus according to claim 56/(1,21), wherein the at least one hormone is secreted by the fundus (gastrins, para [0656]).

As per claim 58/(1,21), Harel teaches the apparatus according to claim 56/(1,21), wherein the at least one hormone is secreted by an antrum of the stomach (gastrins, para [0656]).

As per claim 59/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the at least one hormone is secreted by a duodenum of the patient (secretin, para [0656]).

As per claim 60/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the at least one hormone is secreted by a pancreas of the patient (para [0656]).

As per claim 61/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement is an improvement in a postprandial level of the at least one hormone (para [0697]-[0701]; Tables 1, 2).

As per claim 62/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement is an improvement in a fasting level of the at least one hormone (para [0697]-[0701]; Tables 1, 2).

As per claim 63/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement includes an improvement in a postprandial level of insulin (para [0697]-[0701]; Tables 1, 2).

As per claim 64/(1,21), Harel teaches the apparatus according to claim 63/(1,21), wherein the improvement includes an increase in the postprandial level of insulin (para [0697]-[0701]; Tables 1, 2).

As per claim 65/(1,21), Sanmiguel teaches the apparatus according to claim 51/(1,21), wherein the improvement includes an improvement in a level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for further intake of food, thereby allowing greater control over food intake.

As per claim 66/(1,21), Sanmiguel teaches the apparatus according to claim 65/(1,21), wherein the improvement includes a decrease in the level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for further intake of food, thereby allowing greater control over food intake.

Please See Continuation File

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of:

---Continued from Form 237, Box V.2---

As per claim 67/(1,21), Sanmiguel teaches the apparatus according to claim 51/(1,21), wherein the improvement includes an improvement in a level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for initial intake of food, thereby allowing greater control over food intake.

As per claim 68/(1,21), Sanmiguel teaches the apparatus according to claim 67/(1,21), wherein the improvement includes a decrease in the level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for initial intake of food, thereby allowing greater control over food intake.

As per claim 69/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement includes an improvement in a postprandial level of insulin (para [0697]-[0701]; Tables 1, 2). While Harel does not specify a postprandial level of glucagon, it does note that insulin stimulates the secretion of glucagon (para [0026]); it would have been obvious to one of ordinary skill in the art that improving the postprandial level of insulin might also improve the postprandial level of glucagon.

As per claim 70/(1,21), Harel teaches the apparatus according to claim 69/(1,21), wherein the improvement includes a decrease in the postprandial level of insulin (para [0697]-[0701]; Tables 1, 2). While Harel does not specify a postprandial level of glucagon, it does note that insulin stimulates the secretion of glucagon (para [0026]); it would have been obvious to one of ordinary skill in the art that decreasing the postprandial level of insulin might also decrease the postprandial level of glucagon.

As per claim 71/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement includes an improvement in a level of pancreatic polypeptide (para [0656]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation following food intake.

As per claim 72/(1,21), Harel teaches the apparatus according to claim 71/(1,21), wherein the improvement includes an increase in the level of pancreatic polypeptide (para [0656]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation following food intake.

As per claim 73/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement includes an improvement in a level of pancreatic polypeptide (para [0656]). While Harel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation prior to food intake.

As per claim 74/(1,21), Harel teaches the apparatus according to claim 73/(1,21), wherein the improvement includes an increase in the level of pancreatic polypeptide (para [0656]). While Harel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation prior to food intake.

As per claim 75/(1,21), Harel teaches the apparatus according to claim 51/(1,21), wherein the improvement includes an improvement in a level of glucagon-like peptide-1 (GLP-1) (para [0264]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the body in regulation of insulin and glucagon after food intake.

As per claim 76/(1,21), Harel teaches the apparatus according to claim 75/(1,21), wherein the improvement includes an increase in the level of GLP-1 (para [0264]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the body in regulation of insulin and glucagon after food intake.

With respect to claim 77/(1,21)-78/(1,21), Sanmiguel teaches the apparatus according to claims 1 and 21, but does not specifically teach the control unit is configured to configure one or more parameters of the electrical signal to cause an improvement in a postprandial level of C-peptide as recited by claims 77/(1,21) or the improvement includes an increase the postprandial level of C-peptide as recited by claims 78/(1,21). However, Harel teaches configuring one or more parameters of the electrical signal to cause an increase in levels of various peptides (para [0442]-[0443] and [0656]). Harel also teaches using electrical fields to affect postprandial blood insulin levels (Abstract; para [0697]-[0701]; Tables 1, 2), as well as assessing insulin levels after activating the control unit (para [0448], [0635]). It would have been obvious to one of ordinary skill in the art that these effects might also be applied to levels of C-peptide as well. One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

With respect to claims 79/(1,21)-80/(1,21), Sanmiguel teaches the apparatus according to claims 1 and 21, but does not specifically teach the control unit is configured to configure one or more parameters of the electrical signal to not cause hypoglycemia of the patient as recited by claims 79/(1,21) or the control unit is configured to configure the one or more parameters of the signal to not cause the hypoglycemia, without measuring the blood glucose level of the patient as recited by claims 80/(1,21). However, Harel teaches the control unit is configured to configure one or more parameters of the electrical signal to not cause hypoglycemia of the patient (Harel para [0048]) as recited by claims 79/(1,21) and the control unit is configured to configure the one or more parameters of the signal to not cause the hypoglycemia (Harel para [0048]), without measuring the blood glucose level of the patient as recited by claims 80/(1,21). Harel teaches using electrical fields to reduce blood insulin levels (Abstract). One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

Please See Continuation Sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

With respect to claim 127/(86,113), Sanmiguel teaches the method according to claims 86 and 113, further teaching the control unit is configured to configure one or more parameters of the electrical signal related to glycemic control (pg 3, col 1, para 2-3; Title) but does not specifically teach activating comprises configuring one or more parameters of the electrical signal to cause an improvement in a level at least one hormone selected from the group consisting of: at least one hormone associated with glycemic control, and at least one hormone associated with a metabolic disorder. However, Harel teaches cause an improvement in a level at least one hormone selected from the group consisting of: at least one hormone associated with glycemic control, and at least one hormone associated with a metabolic disorder (para [0442]-[0443] and [0656]). Harel teaches using electrical fields to reduce blood insulin levels (Abstract). One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

As per claim 128/(86,113), Harel teaches the method according to claim 127/(86,113), further comprising assessing the level of the at least one hormone after activating the control unit (para [0448], [0635]).

As per claim 129/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement in the level of the at least one hormone includes a normalization of at least one element selected from the group consisting of: secretion of the at least one hormone, expression of the at least one hormone, and a blood level of the at least one hormone (para [0442]-[0443] and [0656]).

As per claim 130/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the hormone is associated with the glycemic control (para [0442]-[0452] and [0656]).

As per claim 131/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the hormone is associated with the metabolic disorder (Abstract; para [0442]-[0452] and [0656]).

As per claim 132/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the control unit is configured to configure the one or more parameters of the electrical signal to simultaneously cause the improvement in levels of a plurality of hormones (para [0442]-[0452] and [0656]).

As per claim 133/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the at least one hormone is secreted by a stomach of the patient (gastrins, para [0656]).

As per claim 134/(86,113), Harel teaches the method according to claim 133/(86,113), wherein the at least one hormone is secreted by the fundus (gastrins, para [0656]).

As per claim 135/(86,113), Harel teaches the method according to claim 133/(86,113), wherein the at least one hormone is secreted by an antrum of the stomach (gastrins, para [0656]).

As per claim 136/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the at least one hormone is secreted by a duodenum of the patient (secretin, para [0656]).

As per claim 137/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the at least one hormone is secreted by a pancreas of the patient (para [0656]).

As per claim 138/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement is an improvement in a postprandial level of the at least one hormone (para [0697]-[0701]; Tables 1, 2).

As per claim 139/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement is an improvement in a fasting level of the at least one hormone (para [0697]-[0701]; Tables 1, 2).

As per claim 140/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement includes an improvement in a postprandial level of insulin (para [0697]-[0701]; Tables 1, 2).

As per claim 141/(86,113), Harel teaches the method according to claim 140/(86,113), wherein the improvement includes an increase in the postprandial level of insulin (para [0697]-[0701]; Tables 1, 2).

As per claim 142/(86,113), Sanmiguel teaches the method according to claim 127/(86,113), wherein the improvement includes an improvement in a level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for further intake of food, thereby allowing greater control over food intake.

Please See Continuation Sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

As per claim 143/(86,113), Sanmiguel teaches the method according to claim 142/(86,113), wherein the improvement includes a decrease in the level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for further intake of food, thereby allowing greater control over food intake.

As per claim 144/(86,113), Sanmiguel teaches the method according to claim 127/(86,113), wherein the improvement includes an improvement in a level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for initial intake of food, thereby allowing greater control over food intake.

As per claim 145/(86,113), Sanmiguel teaches the method according to claim 144/(86,113), wherein the improvement includes a decrease in the level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for initial intake of food, thereby allowing greater control over food intake.

As per claim 146/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement includes an improvement in a postprandial level of insulin (para [0697]-[0701]; Tables 1, 2). While Harel does not specify a postprandial level of glucagon, it does note that insulin stimulates the secretion of glucagon (para [0026]); it would have been obvious to one of ordinary skill in the art that improving the postprandial level of insulin might also improve the postprandial level of glucagon.

As per claim 147/(86,113), Harel teaches the method according to claim 146/(86,113), wherein the improvement includes a decrease in the postprandial level of insulin (para [0697]-[0701]; Tables 1, 2). While Harel does not specify a postprandial level of glucagon, it does note that insulin stimulates the secretion of glucagon (para [0026]); it would have been obvious to one of ordinary skill in the art that decreasing the postprandial level of insulin might also decrease the postprandial level of glucagon.

As per claim 148/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement includes an improvement in a level of pancreatic polypeptide (para [0656]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation following food intake.

As per claim 149/(86,113), Harel teaches the method according to claim 148/(86,113), wherein the improvement includes an increase in the level of pancreatic polypeptide (para [0656]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation following food intake.

As per claim 150/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement includes an improvement in a level of pancreatic polypeptide (para [0656]). While Harel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation prior to food intake.

As per claim 151/(86,113), Harel teaches the method according to claim 150/(86,113), wherein the improvement includes an increase in the level of pancreatic polypeptide (para [0656]). While Harel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation prior to food intake.

As per claim 152/(86,113), Harel teaches the method according to claim 127/(86,113), wherein the improvement includes an improvement in a level of glucagon-like peptide-1 (GLP-1) (para [0264]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the body in regulation of insulin and glucagon after food intake.

As per claim 153/(86,113), Harel teaches the method according to claim 152/(86,113), wherein the improvement includes an increase in the level of GLP-1 (para [0264]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the body in regulation of insulin and glucagon after food intake.

With respect to claim 154/(86,113)-156/(86,113), Sanmiguel teaches the apparatus according to claims 86 and 113, but does not specifically teach activating comprises configuring one or more parameters of the electrical signal to cause an improvement in a postprandial level of C-peptide as recited by claims 154/(86,113); the improvement includes an increase the postprandial level of C-peptide as recited by claims 154/(86,113); or assessing the level of C-peptide after activating the control unit as recited by claims 154/(86,113). However, Harel teaches configuring one or more parameters of the electrical signal to cause an increase in levels of various peptides (para [0442]-[0443] and [0656]). Harel also teaches using electrical fields to affect postprandial blood insulin levels (Abstract; para [0697]-[0701]; Tables 1, 2), as well as assessing insulin levels after activating the control unit (para [0448], [0635]). It would have been obvious to one of ordinary skill in the art that these effects might also be applied to levels of C-peptide as well. One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

Please See Continuation Sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2 Citations and Explanations

With respect to claim 157/(86,113), Sanmiguel teaches the method according to claims 86 and 113, further teaching implanting (implanted laparoscopically, Abstract – Method; all implantation procedures were performed via laparoscopy, pg 3, col 1, para 2, Surgical Procedure) the electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure) and activating the control unit comprises (The system was interrogated and programmed pg 3, col 1, para 2, Surgical Procedure) identifying that the patient might experience an improvement in a level at least one hormone in response to applying the signal (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), and implanting and activating in response to identifying Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1), but does not specifically teach the at least one hormone is selected from the group consisting of: at least one hormone associated with glycemic control, and at least one hormone associated with a metabolic disorder. However, Harel teaches cause an improvement in a level at least one hormone selected from the group consisting of: at least one hormone associated with glycemic control, and at least one hormone associated with a metabolic disorder (para [0442]-[0443] and [0656]). Harel teaches using electrical fields to reduce blood insulin levels (Abstract). One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

As per claim 158/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement in the level of the at least one hormone includes a normalization of at least one element selected from the group consisting of: secretion of the at least one hormone, expression of the at least one hormone, and a blood level of the at least one hormone (para [0442]-[0443] and [0656]).

As per claim 159/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the hormone is associated with the glycemic control (para [0442]-[0452] and [0656]).

As per claim 160/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the hormone is associated with the metabolic disorder (Abstract; para [0442]-[0452] and [0656]).

As per claim 161/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the control unit is configured to configure the one or more parameters of the electrical signal to simultaneously cause the improvement in levels of a plurality of hormones (para [0442]-[0452] and [0656]).

As per claim 162/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the at least one hormone is secreted by a stomach of the patient (gastrins, para [0656]).

As per claim 163/(86,113), Harel teaches the method according to claim 162/(86,113), wherein the at least one hormone is secreted by the fundus (gastrins, para [0656]).

As per claim 164/(86,113), Harel teaches the method according to claim 162/(86,113), wherein the at least one hormone is secreted by an antrum of the stomach (gastrins, para [0656]).

As per claim 165/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the at least one hormone is secreted by a duodenum of the patient (secretin, para [0656]).

As per claim 166/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the at least one hormone is secreted by a pancreas of the patient (para [0656]).

As per claim 167/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement is an improvement in a postprandial level of the at least one hormone (para [0697]-[0701]; Tables 1, 2).

As per claim 168/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement is an improvement in a fasting level of the at least one hormone (para [0697]-[0701]; Tables 1, 2).

As per claim 169/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement includes an improvement in a postprandial level of insulin (para [0697]-[0701]; Tables 1, 2).

As per claim 170/(86,113), Harel teaches the method according to claim 170/(86,113), wherein the improvement includes an increase in the postprandial level of insulin (para [0697]-[0701]; Tables 1, 2).

As per claim 171/(86,113), Sanmiguel teaches the method according to claim 157/(86,113), wherein the improvement includes an improvement in a level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for further intake of food, thereby allowing greater control over food intake.

As per claim 172/(86,113), Sanmiguel teaches the method according to claim 171/(86,113), wherein the improvement includes a decrease in the level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for further intake of food, thereby allowing greater control over food intake.

Please See Continuation Sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box V. 2 Citations and Explanations
As per claim 173/(86,113), Sanmiguel teaches the method according to claim 157/(86,113), wherein the improvement includes an improvement in a level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for initial intake of food, thereby allowing greater control over food intake.

As per claim 174/(86,113), Sanmiguel teaches the method according to claim 173/(86,113), wherein the improvement includes a decrease in the level of ghrelin (pg 5, col 2, para 2 to pg 6, col 1, para 1). While Sanmiguel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such a reduction would reduce the desire for initial intake of food, thereby allowing greater control over food intake.

As per claim 175/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement includes an improvement in a postprandial level of insulin (para [0697]-[0701]; Tables 1, 2). While Harel does not specify a postprandial level of glucagon, it does note that insulin stimulates the secretion of glucagon (para [0026]); it would have been obvious to one of ordinary skill in the art that improving the postprandial level of insulin might also improve the postprandial level of glucagon.

As per claim 176/(86,113), Harel teaches the method according to claim 175/(86,113), wherein the improvement includes a decrease in the postprandial level of insulin (para [0697]-[0701]; Tables 1, 2). While Harel does not specify a postprandial level of glucagon, it does note that insulin stimulates the secretion of glucagon (para [0026]); it would have been obvious to one of ordinary skill in the art that decreasing the postprandial level of insulin might also decrease the postprandial level of glucagon.

As per claim 177/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement includes an improvement in a level of pancreatic polypeptide (para [0656]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation following food intake.

As per claim 178/(86,113), Harel teaches the method according to claim 177/(86,113), wherein the improvement includes an increase in the level of pancreatic polypeptide (para [0656]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation following food intake.

As per claim 179/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement includes an improvement in a level of pancreatic polypeptide (para [0656]). While Harel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation prior to food intake.

As per claim 180/(86,113), Harel teaches the method according to claim 179/(86,113), wherein the improvement includes an increase in the level of pancreatic polypeptide (para [0656]). While Harel does not specify a fasting level, it would have been obvious to one of ordinary skill in the art that such timing would assist the pancreas in self-regulation prior to food intake.

As per claim 181/(86,113), Harel teaches the method according to claim 157/(86,113), wherein the improvement includes an improvement in a level of glucagon-like peptide-1 (GLP-1) (para [0264]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the body in regulation of insulin and glucagon after food intake.

As per claim 182/(86,113), Harel teaches the method according to claim 181/(86,113), wherein the improvement includes an increase in the level of GLP-1 (para [0264]). While Harel does not specify a postprandial level, it would have been obvious to one of ordinary skill in the art that such timing would assist the body in regulation of insulin and glucagon after food intake.

With respect to claim 183/(86,113)-184/(86,113), Sanmiguel teaches the apparatus according to claims 86 and 113 wherein implanting (implanted laparoscopically, Abstract – Method; all implantation procedures were performed via laparoscopy, pg 3, col 1, para 2, Surgical Procedure) the electrode contact surfaces (pair of electrodes, pg 3, col 1, para 2, Surgical Procedure; bipolar leads, pg 3, col 1, para 2, Surgical Procedure) and activating the control unit (The system was interrogated and programmed pg 3, col 1, para 2, Surgical Procedure) comprises identifying that the patient might experience an improvement in a postprandial level (Gastric Contractility modulation treatment significantly improve glucose control, pg 3, col 2, para 5 to pg 4, col 1, para 2, Effect of Gastric Contractility Modulation on Glucose Control and Figure 1) but does not specifically teach an improvement in a postprandial level C-peptide as recited by claims 183/(86,113) or the improvement includes an increase the postprandial level of C-peptide as recited by claims 184/(86,113). However, Harel teaches configuring one or more parameters of the electrical signal to cause an increase in levels of various peptides (para [0442]-[0443] and [0656]). Harel also teaches using electrical fields to affect postprandial blood insulin levels (Abstract; para [0697]-[0701]; Tables 1, 2). It would have been obvious to one of ordinary skill in the art that these effects might also be applied to levels of C-peptide as well. One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

Please See Continuation Sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V. 2 Citations and Explanations

With respect to claims 187/(86,113)-188/(86,113), Sanmiguel teaches the apparatus according to claims 86 and 113, but does not specifically teach activating comprises configuring one or more parameters of the electrical signal to not cause hypoglycemia of the patient as recited by claims 187/(86,113) or configuring the one or more parameters of the electrical signal to not cause the hypoglycemia does not comprise measuring the blood glucose level of the patient as recited by claims 188/(86,113). However, Harel teaches the control unit is configured to configure one or more parameters of the electrical signal to not cause hypoglycemia of the patient (Harel para [0048]) as recited by claims 187/(86,113) and the control unit is configured to configure the one or more parameters of the signal to not cause the hypoglycemia (Harel para [0048]), without measuring the blood glucose level of the patient as recited by claims 188/(86,113). Harel teaches using electrical fields to reduce blood insulin levels (Abstract). One skilled would find it obvious to combine the references, modifying the teachings of Sanmiguel to include improvement in hormone levels as taught by Harel as the combination would significantly reduce blood glucose levels (Harel Abstract).

Claims 1, 21, 26/(1, 21)-85/(1, 21), 86, 87, 113, 116/(86, 113)-194/(86, 113), 195, 201, 204, 213 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used by industry.

SEARCH HISTORY

Application Number	PCT/IL 11/00116
Search Conducted By	TLH
Search Approved By	ELN

US/IPC Classifications Searched	US:607/40; IPC: A61N 1/00 (2011.01)
Date Conducted	25 August 2011 (25.08.2011)

Documentation Searched	US: 600/1, 309, 345, 347, 365; 607/1, 2, 40, 59, 60, 61, 62, A61N$ (keyword limited, see terms below)
Search Terms Used	Gastrointestinal, GI, Gastroparesis, Fundus, antrum, stomach, pancreas, intestine, duodenum, jejunum, ileum, liver, gallbladder, electric$5, signal$4, stimulat$5, activat$5, excit$5, provok$5, impel$4, trigger$4, electrod$3, contact$3, terminal$3, anode, cathode, without, determ$5, calculat$5, measur$5, impedance, resistance, control$5, processor$5, cable, wire$2, cord$2m eat$3, glucose OR diabetes
Date Conducted	25 August 2011 (25.08.2011)

Electronic Database Searched	PubWest
Files Searched	PGPB,USPT,EPAB,JPAB
Date Conducted	25 August 2011 (25.08.2011)

Search Logic:

Search History

DATE: Thursday, August 25, 2011 **Purge Queries** **Printable Copy** **Create Case**

Set Name Side by Side	Query	Hit Count	Set Name Result Set	Set Name Grid
	DB=PGPB,USPT,EPAB,JPAB; PLUR=NO; OP=ADJ			
L50	L49 and (control$5 or processor$2)	62	L50	L50
L49	L48 and ((detect$5 or determ$5 or calculat$5 or measur$5) and (eat$3))	62	L49	L49
L48	L46 and (without and (determ$5 or calculat$5 or measur$5) and (impedance or resistance))	130	L48	L48
L47	L46 and ((without) near4 (impedance or resistance))	0	L47	L47
L46	L45 and (electrod$3 or contact$3 or terminal$3 or anode or cathode)	258	L46	L46
L45	L44 and (electric$5 or signal$4 or stimulat$5 or activat$5 or excit$5 or provok$5 or impel$4 or trigger$4)	259	L45	L45
L44	L43 and fundus	260	L44	L44
L43	L17 and (gastrointestinal or GI or gastroparesis)	2644	L43	L43
L42	L16 and (gastrointestinal or GI or gastroparesis)	2445	L42	L42
L41	L40 and @pd<20100401	73	L41	L41
L40	L39 and L36	99	L40	L40
L39	L3 and ((detect$5 or eterm$5 or calculat$5 or measur$5) and (eat$3))	363	L39	L39
L38	L37 and L36	101	L38	L38
L37	L3 and eat$3	388	L37	L37
L36	L35 and (cable$2 or wire$2 or cord$2)	253	L36	L36
L35	L34 and (control$5 or processor$2)	293	L35	L35
L34	L32 and L27	295	L34	L34
L33	L32 and :27	998	L33	L33
L32	L3 and (without and (determ$5 or calculat$5 or measur$5) and (impedance or resistance))	1605	L32	L32
L31	L30 and L27	1	L31	L31
L30	L29 and L28	30	L30	L30
L29	L3 and ((determ$5 or calculat$5 or measur$5) near5 (impedance or resistance))	730	L29	L29
L28	L3 and ((without) near4 (impedance or resistance))	46	L28	L28
L27	L26 and L25	523	L27	L27

L26	L3 and (electrod$3 or contact$3 or terminal$3 or anode or cathode)	3134	L26	L26
L25	L24 and L23	530	L25	L25
L24	L3 and (electric$5 or signal$4 or stimulat$5 or activat$5 or excit$5 or provok$5 or impel$4 or trigger$4)	3323	L24	L24
L23	L22 and L18	530	L23	L23
L22	L3 and (fundus or antrum or stomach or pancreas or intestine or duodenum or jejunum or ileum or liver or gallbladder)	863	L22	L22
L21	L3 and (funduc or antrum or stomach or pancreas or intestine or duodenum or jejunum or ileum or liver or gallbladder)	853	L21	L21
L20	L19 and L18	172	L20	L20
L19	L3 and fundus	192	L19	L19
L18	L3 and (gastrointestinal or GI or gastroparesis)	611	L18	L18
L17	L16 or L15 or L14 or L13 or L12 or L11 or L10 or L9 or L8 or L7 or L6 or L4	57957	L17	L17
L16	A61N$.ipc.	54398	L16	L16
L15	607/62.ccls.	514	L15	L15
L14	607/61.ccls.	457	L14	L14
L13	607/60.ccls.	1380	L13	L13
L12	607/59.ccls.	522	L12	L12
L11	607/2.ccls.	1831	L11	L11
L10	607/1.ccls.	420	L10	L10
L9	600/365.ccls.	1177	L9	L9
L8	600/347.ccls.	1040	L8	L8
L7	600/345.ccls.	886	L7	L7
L6	600/309.ccls.	835	L6	L6
L5	600/(1,309,345,347,3650).ccls.	0	L5	L5
L4	600/1.ccls.	680	L4	L4
L3	L2 or L1	3419	L3	L3
L2	A61N1/00.ipc.	2962	L2	L2
L1	607/40.ccls.	512	L1	L1

END OF SEARCH HISTORY

Electronic Database Searched	Google
Files Searched	Patents and Scholar
Date Conducted	25 August 2011 (25.08.2011)

Search Logic:

Google Patents

Patents **1 - 10** on **(Gastrointestinal OR GI OR Gastroparesis) AND electrode and eating**. (**0.16** seconds)

Patents **1 - 10** on **(Gastrointestinal OR GI OR Gastroparesis) AND electrode AND eating AND Fundus**. (**0.25** seconds)

Patents **1 - 10** on **(Gastrointestinal OR GI OR Gastroparesis) AND electrode AND eating AND (glucose OR diabetes)**. (**0.21** seconds)

Patents **1 - 10** on **(Gastrointestinal OR GI OR Gastroparesis) AND electrode AND eating AND Fundus AND (glucose OR diabetes)**. (**0.23** seconds)

Google Scholar

Results **1 - 10** of about 1320 (0.19 secis) on **(Gastrointestinal OR GI OR Gastroparesis) AND electrode AND eating AND Fundus AND (glucose OR diabetes)**.